

Understanding Agility in ISD Projects

Research-in-Progress

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Abstract

Since the 2001 publication of the Agile Manifesto, agile information systems development (ISD) methods have enjoyed increasing popularity. Extant research has highlighted critical challenges and key benefits associated with agile methods. Notwithstanding, the contribution of the actions performed by actors involved in an ISD project toward the achievement of agility remains unclear. This issue motivated the present study, which addresses the question of “how do project teams achieve agility in ISD projects?”. To answer this question a theoretical lens that accounts for the shared understanding that actors have of the ISD process as well as its actual unfolding is adopted. Building on extant conceptualizations of agility in ISD and its constituting facets, a study of three ISD projects within an organization is conducted. The main expected contribution of the study is to offer insight into the actions that contribute to the achievement of the various facets of agility in ISD.

Keywords: Agile software development, Information systems development, Agility, Flexibility

Introduction

In 2001, a group of software engineers published the agile manifesto (Beck et al. 2001), an online document outlining four core values and twelve principles advocating for *agility* in the information systems development (ISD) process. To that end, they emphasized the need to empower individuals, perform work in short development cycles, and involve customers throughout the entire development process. Since the publication of the manifesto, agile methods have enjoyed increasing popularity (VersionOne.com 2013) and research has helped us understand some of the challenges (McAvoy and Butler 2009) and benefits (Lee and Xia 2010) associated with their adoption and usage.

Our review of empirical works on the topic highlights an implicit assumption equating the use of agile methods – such as eXtreme Programming (XP, Beck and Andres 2004) and Scrum (Schwaber and Beedle 2003) – and the achievement of agility. We argue that this assumption hinders our ability to understand the fundamental nature of agility in ISD. In particular, the contribution of the actions performed by actors involved in an ISD project toward the achievement of agility is a topic that has received little attention in past research. To help fill this gap and contribute to the building of theory on the topic, this research-in-progress addresses the question of: “*How do project teams achieve agility in their ISD projects?*”

To select the theoretical lens surrounding the study of our research question, we built on the argument that the idea actors have as to how the ISD process should unfold in principle shapes and yet differs from its actual unfolding in practice (Fitzgerald et al. 2002; Iivari and Maansaari 1998). In the context of agile ISD, this argument has been made in both conceptual (Conboy 2009) and empirical (Fitzgerald et al. 2006) works. To account for this, we adopted the ontology developed by Feldman and Pentland (2003, which conceptualizes social phenomena as mutually constituted by two aspects: (1) an ostensive aspect that represents a “generalized idea” (p. 101) of the phenomenon and (2) a performative aspect that consists of “specific actions, by specific people, in specific places and time” (p. 101). We deem that studying these two aspects, their similarities, differences, and their relationship will allow for a comprehensive account of how ISD teams achieve agility.

Given our theory building objective, we opted for a multiple case study design following Eisenhardt’s (1989) principles. We first turned to existing conceptualizations of agility in ISD to provide an a priori specification of our focal construct. We studied extant definitions to extract four overarching facets of the concept of agility in ISD: flexibility, cooperation, learning, and leanness. We selected three ISD projects within a single organization, thereby controlling for contextual variables such as organization size and culture. The projects were selected based on their properties to allow for both replicating and contrasting our findings. To capture the ostensive and performative aspects, data collection focuses on both the social processes (Strode et al. 2012) and the technical processes (Stahl and Bosch 2014) of the ISD process and relies on multiple data collection methods. Within-case and cross-case analyses will provide a means to build and refine our theoretical explanation from our data.

Relying on the mutually constitutive nature of the ostensive and performative aspects of organizational phenomena, we aim to contribute to the literature on ISD by providing a theoretical explanation as to how ISD teams achieve agility in principle and in practice. In addition, our developing of an a priori specification of the agility construct may serve as a basis for refining the conceptualization and operationalization of the construct. The next sections review the literature on agile ISD, introduce our theoretical lens, describe our research methods, and present our expected contributions.

Literature on Agile ISD

To better understand how agility is achieved in ISD projects, we first turned to existing literature. We searched the Web of Science to extract peer-reviewed articles and conference proceedings published between 2001 and 2015 using the following search string: TOPIC: ((“agile” OR “agility”) AND (“software” OR “systems”)). This process yielded 1,812 results. An initial screening was performed to remove articles on the topic of agility outside of the context of ISD (e.g., in supply chain management) and 285 works were retained. We then restricted this result set to works containing first-hand empirical evidence by searching for abstracts containing the keywords “case” or “survey”, which led to a final list of 86 works, all related to the use of agile ISD methods. The resulting works were then individually read and coded.

Answering the most pressing concerns of practitioners, the literature has focused on the adoption and usage of agile ISD methods in ISD teams (Cloke 2007) or entire organizations (Benefield 2008). In particular, many of these works study the challenges and benefits associated with the implementation of methods such as Scrum or XP (e.g., Marchenko and Abrahamsson 2008). While in many cases a number of positive outcomes such as a reduction in the number of defects (e.g., Korhonen 2010), or the delivery of an artifact on time and on budget (e.g., Lee and Xia 2010) are reported on the project where those methods are used, it has been noted that some of the practices prescribed by agile ISD methods can be detrimental to an ISD team's ability to perform in an optimal manner (e.g., McAvoy and Butler 2009).

In line with the descriptions of agile ISD methods, the literature highlights the relevance of two main categories of processes supporting agile ISD. The first and most commonly reported are *social processes* that build on the importance of the interaction between individuals in an ISD team. These include coordination (Strode et al. 2012), communication (Holmstrom et al. 2006) and collaborative (Helquist et al. 2011) practices which grant an ISD team the speed it needs to react to change in a timely manner. The second category are *technical processes* such as continuous integration (Stahl and Bosch 2014) and refactoring (Wood et al. 2013) that enable shorter development cycles and improve the quality and tangibility of the artifact through the automation of repetitive tasks.

The literature also highlights the multifaceted nature of agility in ISD and illustrates the difference between the formal definition of methods and their use as “methods in action” Fitzgerald et al. (2002). Indeed, while agility is generally defined as the ability “to move quickly and easily” (Merriam-Webster Online 2015), research in ISD, like other fields (Conboy 2009), has acknowledged the difficulty to study it as a unidimensional construct given its complexity. For instance, in an interpretive study of a distributed ISD project, Sarker et al. (2009) have distinguished between resource agility, process agility and linkage agility to categorize a variety of components and tactics that enable overall agility in this context.

Notwithstanding these advances and the growing maturity of research on the topic of agile ISD (Abrahamsson et al. 2009; Dingsøyr et al. 2012), our analysis of the literature highlights three gaps motivating this research.

First, the focus on the use of agile ISD methods reflects an overall implicit assumption regarding the use of those methods and the achievement of agility in ISD. We argue that the link between the enactment of ISD practices, whether they are prescribed by an agile ISD method, and the achievement of agility as a means to yield positive outcomes is missing. It is currently unclear whether such a relationship exists and some have argued that other factors, such as the expertise of an ISD team (Merisalo-Rantanen et al. 2005), provide a better explanation for those outcomes. Indeed, it has been noted that “doing agile” – i.e., “doing the agile practices, not living the agile principles” – and “being agile” – i.e., understanding “the principles that lead to true agile success” – are two different things (Duka 2012:694).

Second, the literature has yet to explore the relationship between the social and technical processes that support an ISD team's ability to deliver working software in short development cycles. Indeed, like traditional ISD methods such as the Waterfall model (Royce 1970), agile ISD methods prescribe a series of practices that seek to organize work. The vast majority of those practices refer to specific social processes (e.g., favoring face-to-face communication) and in line with this trend, literature on the topic has devoted most of its efforts on the study of those processes. However a number of technical processes are often necessary to make the deployment and automated testing of complex software artifacts possible (e.g., Kim and Ryoo 2012) although they are seldom studied. In cases where those technical processes are studied, it is done at the expense of their role as a complement of social processes. We argue that the relationship between the social and technical processes supporting the achievement of agility in ISD, while important, is still unexplored.

Third, despite the large number of works on agile ISD (Hummel 2014), it has been argued that we still lack a clear definition of agility in ISD (Conboy 2009; Hummel 2014). In a systematic review of the agile ISD literature, Hummel (2014) noted that out of the 482 works he reviewed, 265 failed to provide a definition of agility in ISD and 166 used the agile manifesto or an agile method's features as a proxy for this definition. Only 11 works (2%) used research-based definitions of agility in ISD while others used their own definition. Of those, the most commonly used definition – proposed by Abrahamsson et al. (2002) – focuses on highlighting those features that make an ISD method agile and the definition

developed by Conboy (2009), while constructed in a rigorous manner, is based on the notion of agility in other fields (e.g., manufacturing) and still lacks empirical validation .

Theoretical Lens: The Ostensive and Performative Aspects of Organizational Phenomena

ISD projects often rely on the use of methods and frameworks to decompose and organize the roles and responsibilities of the actors involved in their execution. It has been argued that differences exist between the definitions and prescriptions of those methods and their use in practice (Fitzgerald et al. 2002; Iivari and Maansaari 1998). More specifically, the uncertainty (Harris et al. 2009; Lyytinen and Rose 2006) and complexity (Avison and Fitzgerald 2006; Hirschheim and Klein 1989) associated with ISD projects render their execution highly improvisational, regardless of the ISD method used. In agile ISD, the need to deviate from the prescriptions of a given method has also been found to drive the customization of agile ISD methods (e.g., Xu and Ramesh 2007). Accordingly, this work relies on a theoretical lens that accounts for these two aspects as well as their interaction.

We refer to the ontology of organizational routines proposed by Feldman and Pentland (2003). Building on the work of Latour (1986, Feldman and Pentland posit that organizational routines, as other social phenomena, are *mutually* constituted by two aspects. The *ostensive* aspect represents the “generalized idea” (p. 101) of a routine and remains relatively stable over time. The *performative* aspect represents the enactment, in practice, of the actions that form a routine and is “inherently improvisational” (p. 102). Feldman and Pentland further argue that the ostensive aspect of an organizational routine shapes the performances enacted by individuals while the improvisational nature of performances may over time alter its ostensive aspect. The authors advance that the ostensive aspect of routines helps actors exert power over their own or other people’s performance in three ways. The first way is guiding, whereby the ostensive aspect of a routine may serve as a template for action, while leaving actors responsible for the details of the performance of the routine. The second way is accounting, which helps differentiating the elements of a routine that are considered legitimate from those that are not. The third way is referring, by which the ostensive aspect of a routine gives sense to a set of activities that may otherwise be seen as an “unknowable and unpredictable set of actions” (Feldman and Pentland 2003, p. 107). In parallel, the performative aspect of a routine influences its ostensive aspect in three ways. First, it contributes to the creation of routines. Second, it maintains and develops the capabilities required for the performance of the routine. Finally, it may eventually modify the routine either “in response to external changes or in response to reflexive self-monitoring” (p. 108).

This ontology has been used extensively to study the stability and evolution of various organizational routines such as hiring and budgeting (e.g., Feldman 2004). It has also been used in the context of the design and implementation of an IS to show the discrepancies that exist between the ostensive view of a routine as embedded in a system and its actual enactment by system users (Pentland and Feldman 2008). This work highlights the importance of accounting for these two aspects as well as their relationship to gain a more comprehensive understanding of organizational phenomena. In IS, Volkoff et al. (2007) have adopted this perspective to study organizational elements such as routines, roles, and data, and found that embedding work processes in technological artifacts gave them a material aspect that mediated the process of change associated with the ostensive and performative aspects of those work processes.

We thus suggest that, as an organizational phenomenon, the agile ISD process can be conceptualized and studied as being constituted by an ostensive and a performative aspect. The ostensive aspect represents the generalized idea as to how agility in ISD should be achieved *in principle* using a combination of social (Strode et al. 2012) and technical (Stahl and Bosch 2014) processes and which may be based on the prescriptions of an agile ISD method. The performative aspect is the repertoire of performances enacted by the members of an agile ISD team and which represents the achievement of agility *in practice*. While ISD methods and the ostensive aspect of agile ISD each provide a means to understand why work is performed in a certain manner, they only provide a partial picture of those projects in practice. Conversely, the performance of ISD alone forgoes the role of the ostensive aspect as a device which framed the performances of actors.

Together these two aspects account for differences, similarities, as well as complementarities between the idea actors have of agility in ISD and its achievement in practice. More specifically, the mutually

constitutive nature of these two aspects allow us to understand two important facets of the ISD phenomenon: (1) how the ostensive aspect of agility in ISD – which may be prescribed by a method – shapes the performances of actors as observed in many empirical studies on the topic (Vidgen and Wang 2009); and (2) how the performative aspect can over time alter the ostensive aspect of agility in ISD process and reconfigure the prescriptions of a method through the customization or tailoring of that method (Fitzgerald et al. 2006).

Our research question is informed by this perspective in its ability to help understand how agility is achieved in principle, based on the idea that actors have as to how agility is achieved, as well as its achievement in practice. While the practice of ISD may be improvisational, it is framed by an idea as to how it should be performed (e.g., through a method). We argue that enhancing our understanding of the idea as to how ISD is conducted clarifies the variations of its performance. The study of both the ostensive and performative aspects of ISD provides an opportunity to understand how congruent a practice is with the spirit of the approach, thereby increasing our understanding of the dynamics at play in an ISD project. For example, an ISD team may enact practices based on the idea that flexibility should be emphasized while the performance of ISD actually favors cooperation. In the next section, we present the methodology selected to answer our research question.

Research Methods

Given our theory building objective, we opted for a multiple case study design and followed Eisenhardt's (1989) principles on the topic (p. 533).

A Priori Specification of Agility in ISD

In line with Eisenhardt's recommendation of providing "a priori specification of constructs" (p. 533), we reviewed extant conceptualizations of agility in ISD. The objective of this first step was to understand how past research has approached the notion of agility in ISD and use those findings as a sensitizing device to orient the collection and analysis of our data. In line with observations made in the IS literature and other fields, we acknowledge the multifaceted nature of the concept of agility in ISD and argue that it is best approached based on its constituting facets rather than as a broad, unidimensional concept (Lee and Xia 2010; Rodriguez et al. 2012; Sarker et al. 2009). Table 1 presents the definitions of agility in ISD found in the literature and Table 2 showcases four main facets of agility in ISD.

Table 1. Extant definitions of agility in ISD		
Source	Definition	Foundation
Abrahamsson et al. (2002)	"What makes a development method an agile one? This is the case when software development is incremental (small software releases, with rapid cycles), cooperative (customer and developers working constantly together with close communication), straightforward (the method itself is easy to learn and to modify, well documented), and adaptive (able to make last moment changes)"	Existing agile ISD methods
Boehm and Turner (2004)	"Agility applies memory and history to adjust to new environments, react and adapt, take advantage of unexpected opportunities, and update the experience base for the future"	Unspecified
Qumer and Henderson-Sellers (2006)	"Agility is a persistent behavior or ability of a sensitive entity that exhibits flexibility to accommodate expected or unexpected changes rapidly, follows the shortest time span, uses economical, simple and quality instruments in a dynamic environment and applies updated prior knowledge and experience to learn from the internal and external environment"	Unspecified
Conboy (2009)	"The continual readiness of an ISD method to rapidly or inherently create change, proactively or reactively embrace change, and learn from change while contributing to perceived customer value (economy, quality, and simplicity), through its collective components and relationships with its environment"	Other disciplines and previous work on the topic (Conboy and Fitzgerald 2004)

We relied on the work of Hummel (2014) who noted that the two most commonly used definitions of agility in ISD originate from Conboy (2009) and Abrahamsson et al. (2002). To those, we added other popular definitions proposed by Qumer and Henderson-Sellers (2006) and Boehm and Turner (2004), as presented in Table 1.

To identify the constituting facets of agility in ISD, we inventoried the dimensions of agility found in the definitions presented in Table 1 and grouped them based on their descriptions. To those definitions we added Wufka's (2013) work which relies on a deductive approach to extract key dimensions of agility in ISD for empirical measurement. The result of this process, shown in Table 2, showcases four main facets of agility in ISD. In line with its multidimensionality, we posit that agility in ISD may be observable in settings where only a subset of those facets are present and that these facets may not fully cover the scope of the twelve principles of the manifesto at the root of the concept of agility in ISD.

Table 2. Specifying the Facets of Agility in ISD	
Facet	Corresponding dimensions found in other definitions
Flexibility: ability for a group of individuals involved in an ISD project to sense the need for change and respond to it promptly	<ul style="list-style-type: none"> • Adaptive (able to make last moment changes) (Abrahamsson et al. 2002) • React and adapt (Boehm and Turner 2004) • Take advantage of unexpected opportunities (Boehm and Turner 2004) • Flexibility (Conboy 2009) • Responsiveness (Qumer and Henderson-Sellers 2006) • Flexibility (Qumer and Henderson-Sellers 2006) • Speed (Qumer and Henderson-Sellers 2006) • Early recognition of the need for changes (Wufka 2013) • Quick response to recognized required changed (Wufka 2013)
Cooperation: ability for a group of individuals involved in an ISD project to work together	<ul style="list-style-type: none"> • Cooperative (customer and developers working constantly together with close communication) (Abrahamsson et al. 2002)
Learning: ability for a group of individuals involved in an ISD project to build on past experience to adjust their internal processes	<ul style="list-style-type: none"> • Agility applies memory and history to adjust to new environments (Boehm and Turner 2004) • Update the experience base for the future (Boehm and Turner 2004) • Learning (Qumer and Henderson-Sellers 2006) • Process agility (Wufka 2013)
Leanness: ability for a group of individuals involved in an ISD project to produce software using principles of economy, simplicity and quality	<ul style="list-style-type: none"> • Straightforward (the method itself is easy to learn and to modify, well documented) • Incremental (small software releases, with rapid cycles) (Abrahamsson et al. 2002) • Leanness (Conboy 2009) • Leanness (Qumer and Henderson-Sellers 2006) • High degree of tangibility of intermediate results (Wufka 2013) • Low overhead/leanness (Wufka 2013)

To build descriptions for the four facets presented in Table 2, we referred to the agile manifesto as the root of the notion of agility in ISD. In line with the definition of a principle as “a moral rule or belief that helps one know what is right and wrong and that influences one's actions” (Merriam-Webster Online 2015), we note that the signatories of the manifesto state that they *follow* its twelve principles. This anchors agility in ISD as an amethodical (Truex et al. 2000) concept based on the actions of a group of individuals who abide by those principles, in line with a conceptualization of ISD as a social process (e.g., Cockburn and Highsmith 2001; Fitzgerald et al. 2002) rather than the features of a method.

To help refine this a priori specification of agility in ISD, two additional steps are proposed. The first step consists in open-ended interviews with professionals working in ISD projects. Respondents are asked to reflect on their definition of agility in the context of ISD. The objective is to code respondents' answers against our extant facets while staying open to other, emergent facets. 35 interviews have been conducted so far. The second step will involve a card sorting exercise to map the twelve principles of the manifesto onto the facets we have extracted from the literature while allowing other facets to emerge. Following recommendations from Moore and Benbasat (1991), several rounds will be performed to ensure sufficient inter rater agreement.

Together these steps will provide a series of facets that form the concept of agility in ISD. Those facets will reflect the perspective of researchers as well as practitioners and serve as a sensitizing device for the empirical investigation of our research question.

Entry in the Field

We decided to perform our data collection within a single organization. Through one of the authors' personal contacts, we approached a consulting firm, AgileConsult, specializing in ISD using the Scrum method. AgileConsult allowed us to review its portfolio of clients. We identified Entertain, one of AgileConsult's clients at the time, as a privileged site given our theory building objective and initiated contact with them in early 2014. The selection of a single site is consistent with extant literature on agile ISD that has stressed the relevance of organizational factors within which agile ISD methods are used to understand the adoption of those methods (Batra 2009). Controlling for those contextual factors allows us to more reliably replicate and contrast our findings across cases to build our theoretical explanation.

Entertain is an organization founded in the early 1980s specializing in the entertainment industry. It employs more than 10,000 employees and its headquarters are located in North America. Traditionally, Entertain relied on outsourcing partners to handle its IT operations. Vendors followed an approach close to the Waterfall model, maintaining an arm's length relationship with Entertain's business units. By the mid-2010s, diminishing revenues and a perceived gap between the needs of business units and the ability for outsourcing partners to respond to those needs in time made Entertain reconsider those earlier choices. IT managers decided to undertake what they call an "agile turn" and implement a series of practices based on the use of the Scrum method to conduct projects seeking to replace legacy systems and develop new systems that better respond to the evolving needs of business units.

New ISs are now developed on a private cloud infrastructure that is in constant evolution. While ISD projects are still conducted by outside consultants, key roles within those projects are held by permanent employees who ensure that Entertain's vision is maintained as its IT infrastructure evolves. ISD projects are conducted onsite and members of business units are encouraged to actively participate in their execution. Following a review of ISD projects where agility was perceived as an important factor for project success by members of Entertain, access was granted to collect data for our first case, BI.

Presentation of Cases

Personal contacts with members of AgileConsult working on BI facilitated entry into the field and helped the authors become acquainted with the context at Entertain. While data was being gathered for this case, the portfolio of agile ISD projects at Entertain was reviewed with members of the project management office who granted access to two other ISD projects. Together those three projects exhibit similarities as well as differences that are propitious to the generation of insight with regards to our research question. For instance, similarities will help to achieve a logic of literal replication while discrepancies will help nuance findings and achieve a logic of theoretical replication based on our emergent findings (Yin 2013) although at this stage, no theoretical explanation has been formed yet. Table 3 presents each case to highlight those similarities and differences.

Table 3. Presentation of Cases

Case	BI	EVENT	RESOURCE
Type of IS	Marketing intelligence	Operational application	Operational application
Primary user base	Marketing staff	Operational staff	Operational staff
Purpose	Assist decision making	Schedule events	Manage resources
Technology	Web application	Web application	Web application
Prior attempts	2 (both failures)	None	None
ISD method	Scrum	Scrum	Scrum
Clarity of initial requirements	Low (some basic requirements had been drawn during prior attempts)	Moderate (requirements emerging from the replacement of legacy systems were well known; others were less clear)	Moderate (requirements emerging from the replacement of legacy systems were well known; others were less clear)
Sprint duration	2 weeks	2 weeks	2 weeks
Number of sprints	15	12	25
Release date (planned/actual)	January 2014/March 2014	April 2014/April 2014	May 2015/July 2015
Core team size	8	7	9
Core team composition (C: consultant; P: permanent employee)	<ul style="list-style-type: none"> • 1 Project lead (C) • 1 analyst (C) • 1 architect (P) • 3 frontend developers (C) • 2 backend developers (C) 	<ul style="list-style-type: none"> • 1 Project lead (C) • 1 analyst (C) • 1 architect (P) • 3 frontend/backend developers (C) • 1 database developer (C) 	<ul style="list-style-type: none"> • 1 Project lead (C) • 1 analyst (C) • 2 architects (1 I, 1 C) • 5 frontend/backend developers (C)
Experience with agile ISD methods	Extensive	Moderate	Moderate
Access to end users	Yes	Indirectly	Only for some features
Project lead characteristics	<ul style="list-style-type: none"> • Consultant • Scrum Master 	<ul style="list-style-type: none"> • Consultant • Scrum Master 	<ul style="list-style-type: none"> • Consultant • PMI and ITIL certified
Main data sources (as of August 2015)	<ul style="list-style-type: none"> • 8 interviews • 7 hours of observation 	<ul style="list-style-type: none"> • 5 interviews • 7 hours of observation 	<ul style="list-style-type: none"> • 2 interviews • 14 hours of observation

Instruments and Protocols

Data collection focuses on both the social processes – e.g., coordination, communication, and collaboration – and the technical processes – e.g., continuous integration and refactoring – of the ISD process. In line with Pentland and Feldman (2005 recommendations, we rely on two main sources of data to study the ostensive and performative aspects of these processes in our cases. First, semi-structured interviews with various stakeholders involved in each project are conducted to account for the projects' ostensive aspects. Interviews are performed face to face, recorded and transcribed. When they cannot be recorded, interview notes are taken during the interview and complemented following the interview. Additional questions are discussed with respondents via email or in person.

Second, field observation is used to study the practices enacted by actors and gain insight into the performative aspect of the project. One author attends events (e.g., planning meetings), gathering field notes which are then typed and integrated in the case database. These notes include observation data as well as introspective data, along with other pieces of data such as non-verbal cues or room layouts. These data are supplemented by project documentation and correspondence between project members.

Data Analysis

Data analysis will be performed in two steps. The first step will involve within-case analysis through the coding of our data against our extant facets of agility in ISD to extract both the ostensive and the performative aspects aspect in each case as well as their relationship. As mandated by the open nature of our research question, our coding process will also remain sensitive to the emergence of new facets of agility in ISD. To do so we will borrow from grounded theory coding techniques (Charmaz 2006), more specifically the use of *initial* and *focused* coding in order to uncover other “theoretical possibilities we can discern in the data” (p. 46). These emergent codes will also be placed into chains of evidence once they are reduced to a consistent level of granularity through the use of axial coding (Charmaz 2006:60).

Cross-case analysis will then be performed to compare and contrast findings across cases (Eisenhardt 1989). While common patterns are desirable at this stage, discrepancies may also yield insight based on the elements presented in Table 3. Cross-case analysis will build on within-case analysis to generalize findings and generate theoretical insight. Patterns uncovered from these analyses may help us define *configurations* reflecting different instantiations of agility in ISD and supported by different ostensive and performative aspects. For example, we may observe that the performative aspects of two ISD projects reflect *flexibility*. However, we may also find that a case’s ostensive and performative aspects do not reflect a facet of agility in ISD found in other projects (e.g., learning).

Conclusion

Acknowledging the complex nature of agility in ISD, this work builds on the relevance of the *idea* of agility in ISD and its achievement *in practice* to propose the study of the ostensive and performative aspects of ISD projects. Using an a priori specification of agility in ISD based on extant literature on the topic to assist in the empirical investigation of our research question and accounting for both social and technical processes, we argue that the study of will not only inform our research question but also provide insight regarding the reasons underlying the enactment of certain practices based on the idea that actors have formed of their purpose.

This work is expected to make its main contribution to the literature on ISD. More specifically, we seek to contribute to the building of a theoretical explanation to help understand how project teams achieve agility through the study of the ostensive and performative aspects of the ISD process, accounting for its embedded social and technical processes. Our work suggests that projects may emphasize certain facets of agility at the expense of others. These configurations may differ across projects as well as between the ostensive and performative aspects of a given project, highlighting the gaps that are often observed between the expectations that actors form of an ISD project and its actual outcome. In addition, our a priori specification of the agility construct may serve as a basis for refining the conceptualization and operationalization of the construct.

One limitation of this work is the selection of three case studies within a single organization. While this limits the potential to generalize our findings, it provides a means to control for important variables which may otherwise confound those findings. Based on the expected contributions of this work, future research may look into other types of ISD projects, such as distributed ISD or outsourced ISD. As a theory building work on the achievement of agility in ISD, this research-in-progress relies on this boundary condition to establish a rigorous and relevant theoretical foundation to motivate future research on the topic.

This work is expected to have implications for research and practice. For research, our work questions the implicit assumption that the use of agile ISD methods equates the achievement of agility and acknowledges, both conceptually and empirically, the ostensive and performative aspect of ISD projects as well as their relationship. For practitioners, this work points to the importance of considering the differences that may exist between the idea of agility actors may have and its achievement in practice.

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